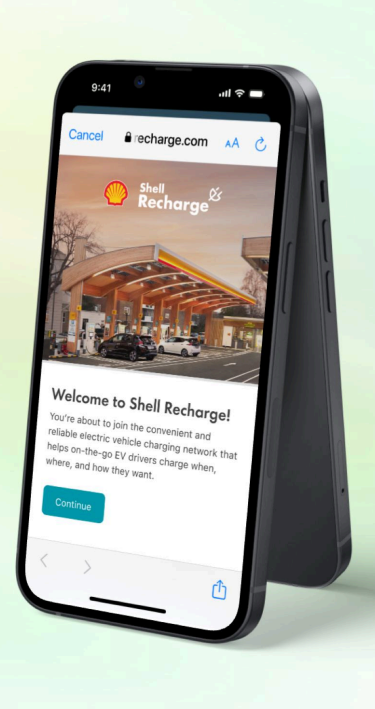
UX Case Study: Crafting a Seamless Plug And Charge Experience by Reducing Cross-Platform Friction

UX Case Study · 4 months



Project Overview

We partnered with leading automotive OEMs such as BMW, Jaguar Land Rover and others to simplify EV charging for their customers.

The goal was to remove friction from the charging process, making it as seamless as filling up fuel, while ensuring brand alignment and trust.

The initiative allowed new car buyers to access exclusive discounts at Shell Recharge stations. The solution needed to integrate across OEM platforms, create a simple onboarding journey, and enable plug-and-charge functionality without requiring users to open an app during charging.

Problem Statement

Fragmented Charging Process

Multiple networks, apps, memberships, and incompatible stations force users into trial and error, increasing confusion and wasted time.

High Cognitive Load During Setup

Users must remember logins, manage memberships, input payment details, and locate the correct app while standing at a station.

Low Session Confidence & Lack of Feedback

Users often don’t know whether the charging session started, leading them to wait beside their vehicle or retry actions.

Poor End-to-End Integration

Vehicle dashboards, OEM apps, and charging networks operate in silos, producing a disconnected and non-premium experience.

Research

1 User interviews

15 Users · 1 month

Conducted 45 minute semi-structured interviews with 15 BMW EV Owners. Participants represented diverse demographics, charging behaviors, and geographic locations across urban and suburban areas.

Research Objective

Focused on uncovering pain points, understanding mental models, and identifying opportunities to make EV charging seamless and intuitive

User Pain Points

App Fatigue

Users expressed frustration with needing multiple apps for different charging networks. The cognitive load of managing multiple accounts, passwords, and payment methods across platforms was a significant source of stress

71%

Payment Friction

The payment process created multiple friction points: entering credit card details at each new station, unclear pricing structures, and delayed receipts. User wanted transparent, automated payments similar to mobile payments systems they use daily

64%

Session Uncertainty

Most users reported anxiety about whether their charging session had successfully started. This uncertainty often led to users staying near their vehicle instead of leavinf to run errands.

82%

Station Availability

While slightly lower than other pain points, users struggled to find available stations that were compatible with their payment method or membership. Integration with vehicle navigation was inconsistent, leading to wasted trips

94%

Slow Process

The average time to initiate charging was 2-3 minutes, which users found unacceptable

98%

User Voice

Direct quotes from our interviews revealed the depth of user frustration and provided invaluable context for our design decisions:

> “I just want to plug in and charge. Why do I need three different apps to charge my car in different places? It should be as simple as using Apple Pay.”
>
> -Sarah M, BMW iX Owner, Los Angeles

> “Half the time I’m not even sure if the session has started. I end up waiting awkwardly next to my car.”
>
> -Priya S, BMW i3 Owner, Chicago

> “Every station has a different process. Scan here, tap there, log in again... it feels like I’m setting up a new device every time.”
>
> -Daniel R, BMW i4 Owner, Seattle

> “I bought a premium car. Why doesn’t charging feel integrated into it? It should work like Apple CarPlay—automatic.”
>
> -Tom B, BMW i7 Owner, Miami

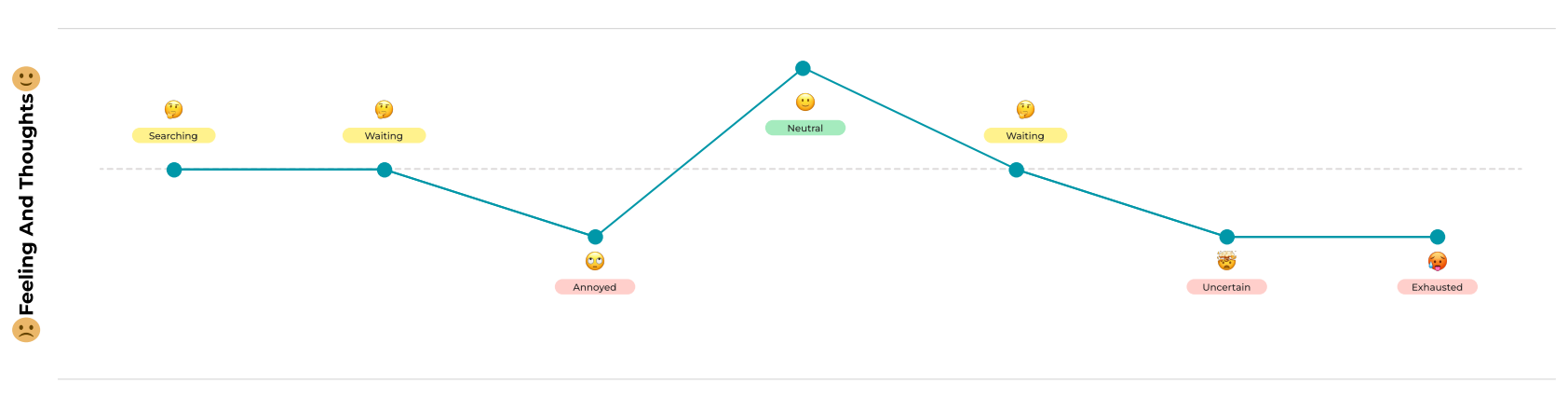
Research

2 Current Journey Analysis

We mapped the complete user journey from arriving at a charging station to successfully starting a charging session. This journey revealed seven distinct steps, each with its own potential for friction. Notably, user sentiment deteriorates significantly from arrival to confirmation, indicating a fundamentally broken experience.

Key breakpoints: Unclear charger labeling, multiple apps, login failures, payment setup, and delayed confirmation feedback.

User Journey



Action	Activation	Discovery/Trip Planning	Arrival And Plug In	Charging Session	Stop Charging And Leave	Post Charging And Billing	Trust And Intention Loop
Time	60 Sec	45 Sec	30 Sec	90 Sec	60 Sec	55 Sec	45 Sec
User Intent	• Enable Plug And Charge Once And Forget About It	• Know Where To Charge, • Price, And Compatibility	• Plug In And Walk Away	• Charge Reliably • Track Cost	• Unplug And Go	• See Receipt • Forget About It	• Feel Confident Returning
Non Negotiable Experience	• One Time Activation • Clear Confirmation • Works Across Networks	• Clear PnC Label • Upfront Pricing • Real-Time Availability	• Auto Authentication < 10s • No User Action	• Live KWh, • Cost, • Time Remaining Across UI	• Instant Stop • Clear End Confirmation	• Auto Receipt • Unified History	• Reliable Repeatable Experience
Current Market Pain Point	• Confusion Setup, • OEM/MSP Fragmentation, • Unclear Eligibility	• Pricing Hidden, • Unreliable Availability, • Vague PnC Support	• Authentication Fails, • Forced App Fallback, • Slow Start	• No Live Cost View	• Session Not Ending, • Idle Fee Applied	• Fragmented Billing, • Unclear Chargers	• Inconsistent Experience Erodes Trust
Opportunity	• Zero-Friction Activation • Simple Language Confirmation	• Compatibility Confidence • Total Cost Estimate	• Smart Fallback And Clear Failure Messaging	• Predictive Alerts • Real Time Pricing	• Proactive Idle Warnings	• Single Charging Ledger	• Trust Based Loyalty
Key Impact Matrics	• Activation Success Rate • Activation Time • Drop-Off	• Trip Planning Completion • Pre Arrival Drop Off	• Time To Charge Start • Zero Interaction Start Rate	• Session Completion • Cost Disputes	• Successful Termination • Idle Disputes	• Support Tickets	• Repeat Usage • Churn

Research

3 Competitive Analysis

	Ease Of Use	Security	Integration	Experience	Additional notes
Tesla	Industry leading seamless plug and charge, fastest session start time (8.59 sec)	Strong, stable closed ecosystem reduces risk	Deep vehicle + charger integration	Most reliable network • 96–98% session success • 4.8/5 UX rating	Gold-standard user experience
Shell	Mixed Reviews; reports of high user friction & reliability issues	Reported payment failures & downtime issues	Integrations exist but vary by region	Lower reliability vs major competitors	Needs UX improvements
Charge Point	Often inconsistent due to hardware variance	Some reliability + payment problems (varies by operator)	Limited deep integration	Mixed experience	Hardware owned by hosts
EV Go	Urban coverage	More stable uptime after Tesla	Cross-network roaming	Generally positive but not premium	Urban-focused

Key Insights: The Tesla sets the benchmark in ease of use, experience, reliability, and integration. Its tightly controlled hardware-software ecosystem enables a frictionless user journey that other networks have yet to match.

Research

4 Session Data Analysis

App Interaction patterns

65% of users opened the wrong charging app first, then had to search for the correct one

75% experienced login issues (forgotten passwords, expired sessions, two-factor delays)

89% checked the app multiple times within the first 5 minutes to confirm charging had started

Time Sensitivity

Quick stops (30 min or less): Users expressed highest frustration with setup time. “Every minute counts when I’m just topping up”, explained one user.

Long Charging sessions (1+ hours): Setup friction was less critical, but users still wanted to leave their vehicle quickly to run errands

First-time visits: Average setup time was 4-6 minutes as users created accounts and added payment information

Research

5 Priority Ranking

Users consistently expressed a desire for a charging experience that feels effortless and predictable.

These priorities helped us to shape our design decisions and highlight what matters most in real charging scenarios.

1

Speed of initiation
“ I want to plug in and go”
- mentioned by 14/15 participants

2

Session certainty
“ Clear confirmation that charging has started”
- mentioned by 12/15 participants

3

Payment Simplicity
“ Automatic payment like Apple Pay”
- mentioned by 11/15 participants

4

Integration with vehicle
“ It should feel like part of my car” - mentioned by 8/15 participants

Design Opportunities

Eliminate Manual Steps

We streamlined the charging journey by removing unnecessary actions, enabling users to start a session with minimal effort. By automating authentication, discount application, and payment triggers, the experience becomes faster, more intuitive, and closer to a true plug and charge flow. This reduces cognitive load and increases user confidence during each charging session.

Trust and Transparency

We addressed common user concerns by making key information such as pricing, discount application, and session status clear and upfront. Transparent communication builds trust and reduces anxiety around payment, charger readiness, and session initiation. This clarity helps users feel in control, especially in unfamiliar or high-traffic charging locations.

Design Opportunities

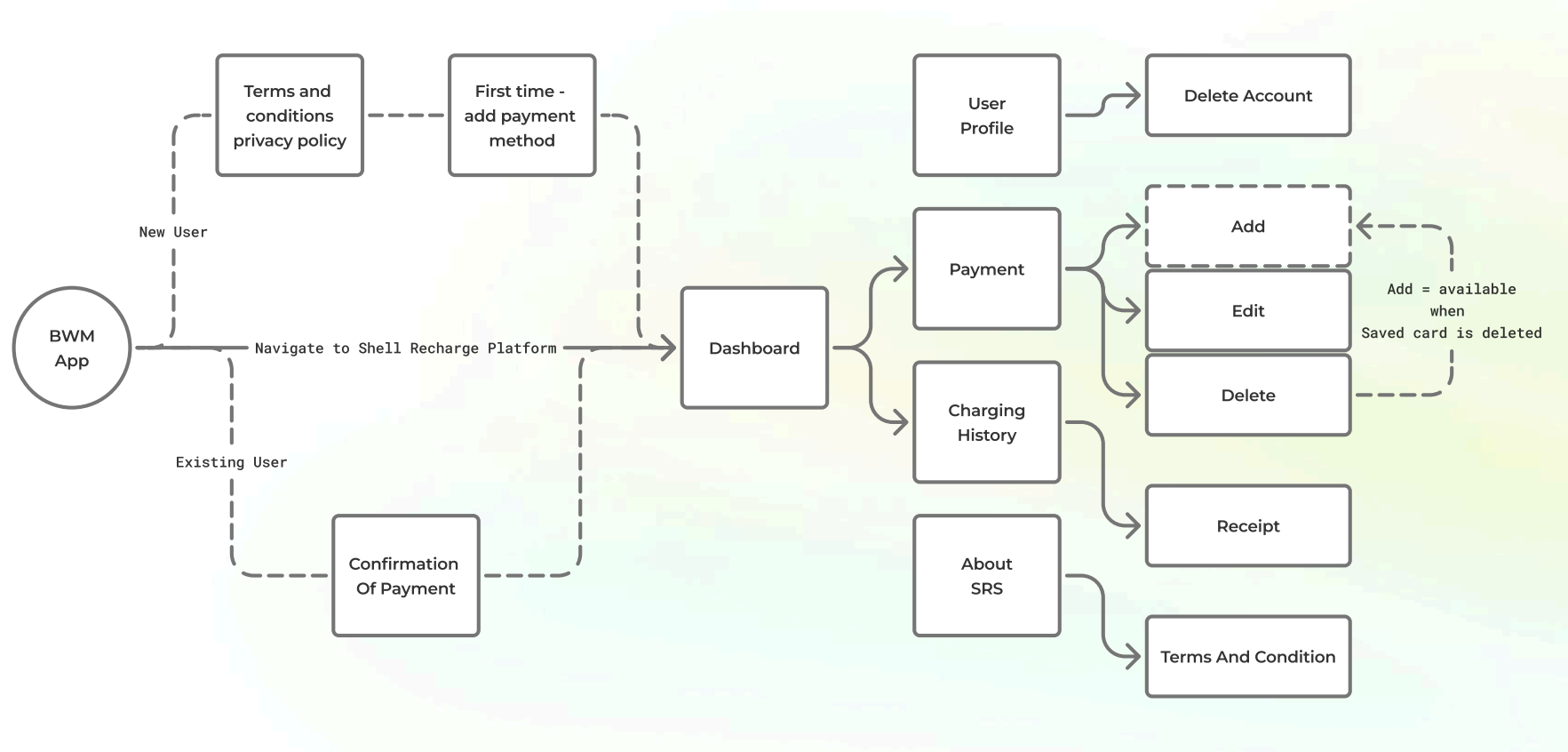
One-Time Setup

The onboarding process was redesigned to require user input only once, with all future interactions happening automatically. This ensures a smooth transition from account creation to first charge, while reducing friction for new EV owners who may be unfamiliar with public charging. After setup, users can charge effortlessly without repeatedly logging in, verifying identity, or managing preferences.

Premium Brand Alignment

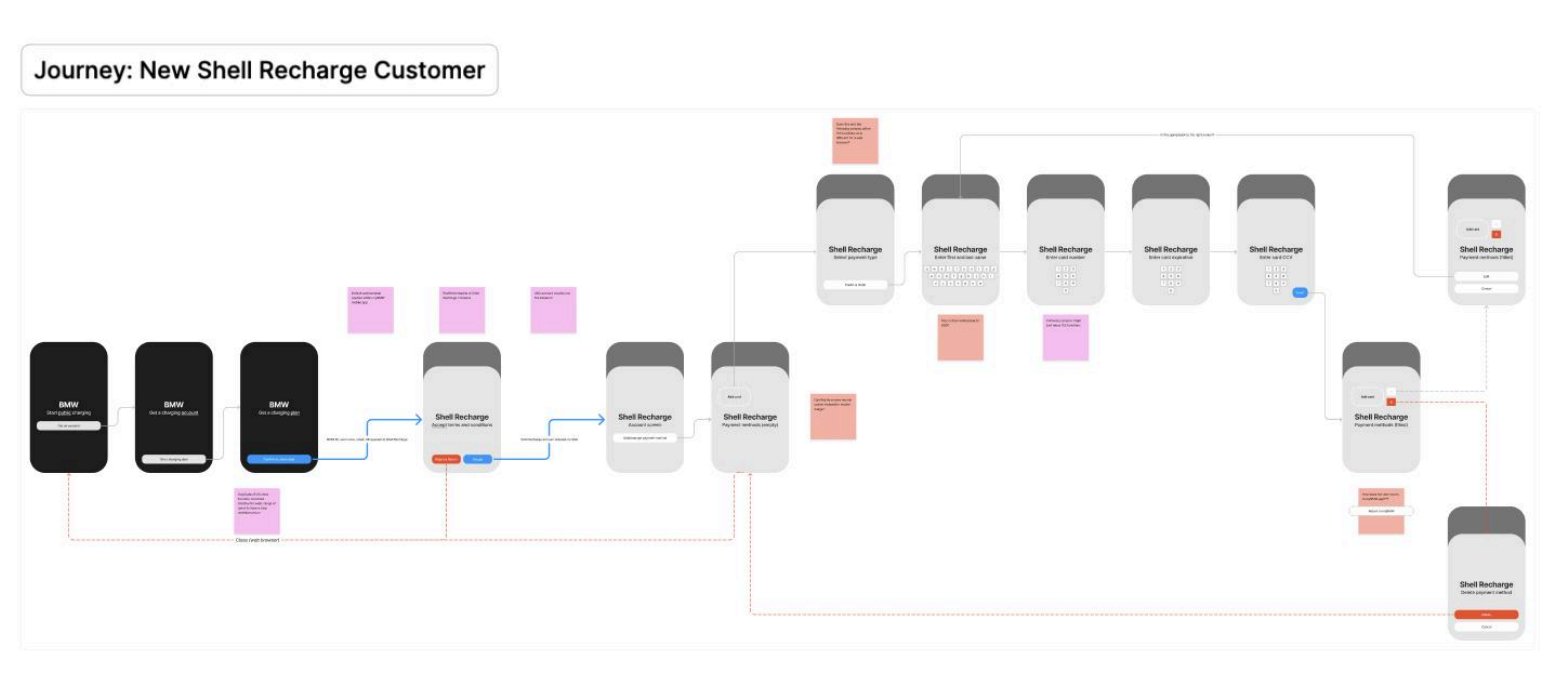
The experience was designed to reflect both Shell Recharge’s identity and the standards of partner OEMs like BMW and JLR. Through cohesive UI patterns, consistent messaging, and a polished visual system, the solution reinforces premium brand values at every touchpoint. This alignment ensures that users feel the same level of quality in the charging experience as they do in their vehicle.

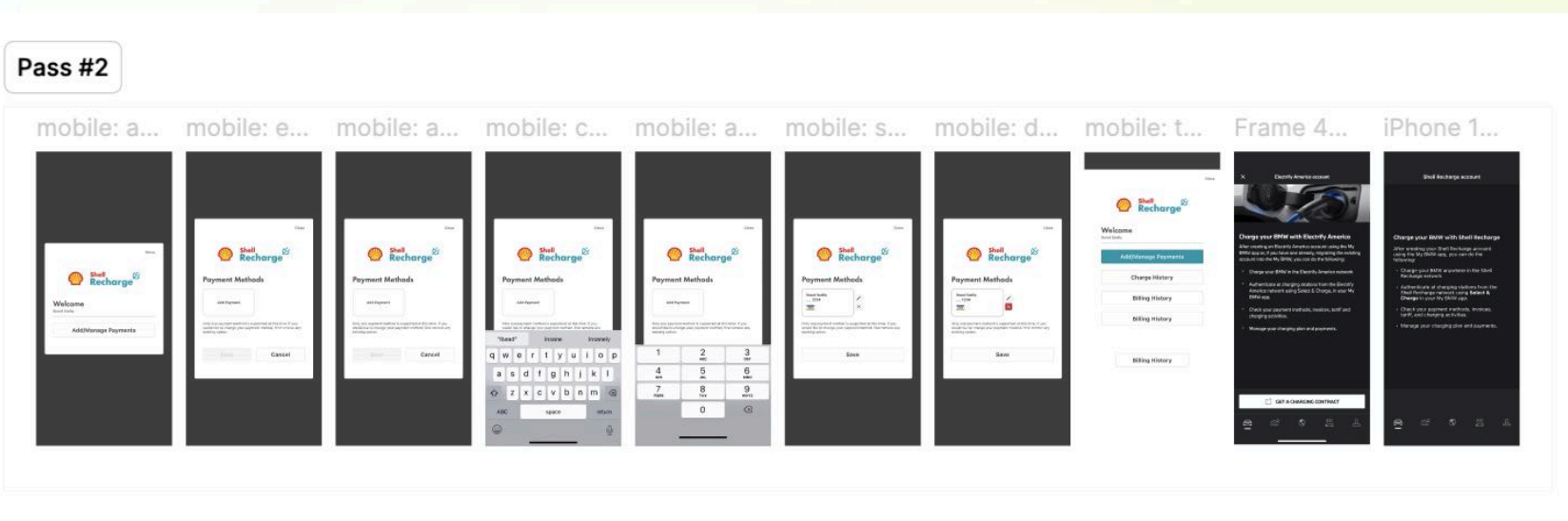
High Level User Flow



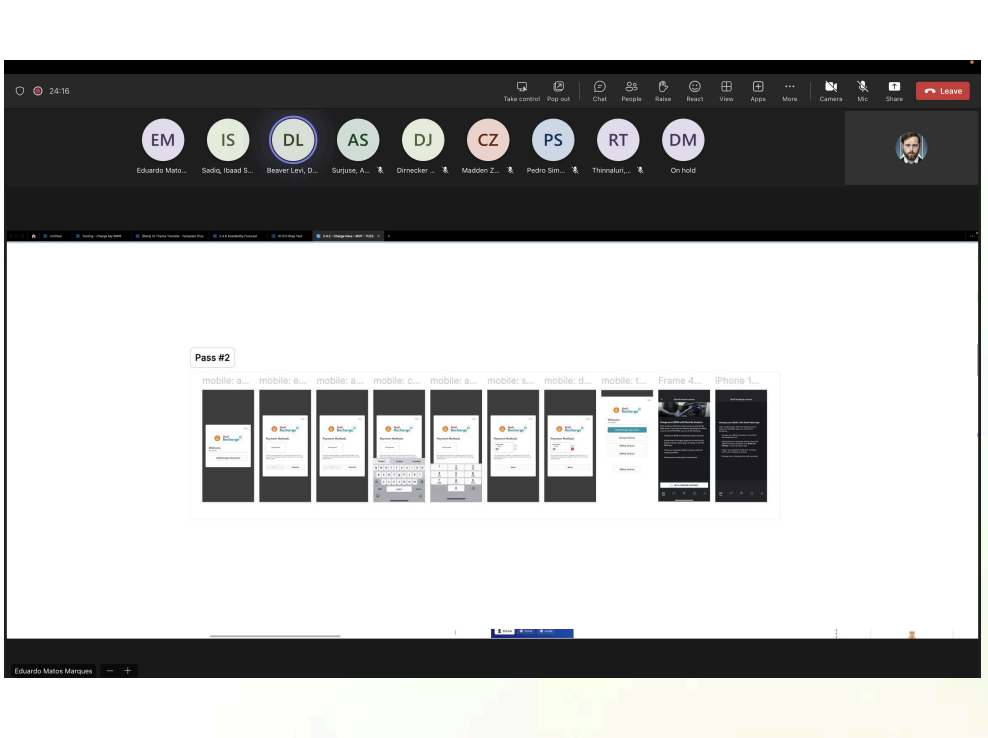
Early Exploration Of Flows And Structure

Low-fidelity layouts allowed us to experiment quickly with navigation, hierarchy, and task flows. This stage ensured we solved usability issues early, before committing to high-fidelity design.





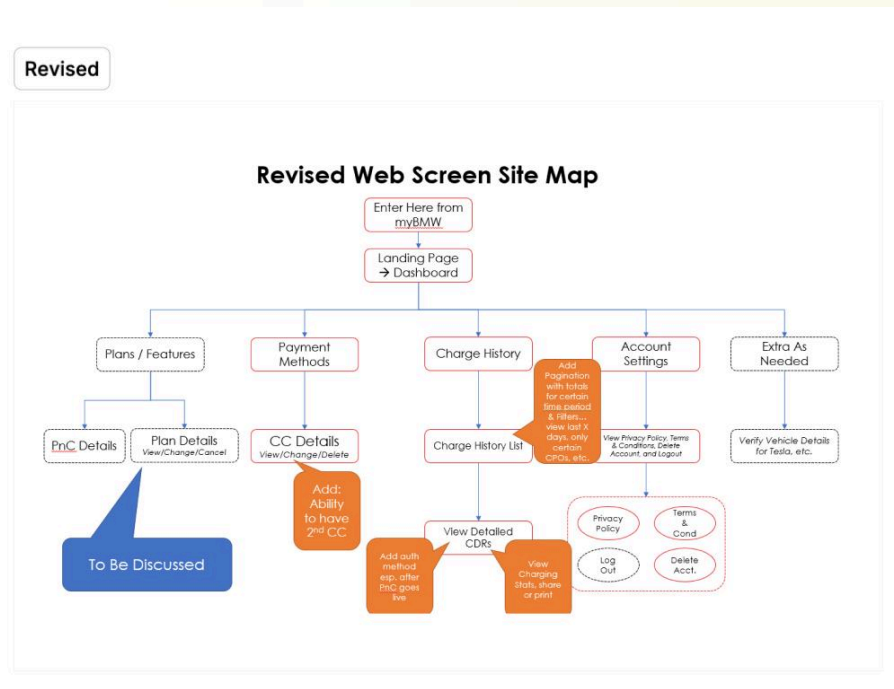
Validating And Refining Through User Testing



Iterative Testing Of Core Flows

We conducted remote usability sessions to observe how users navigated the initial wireframe flows.

These tests helped us identify friction points, clarify moments of confusion, and validate whether the redesigned steps reduced effort and improved clarity.



Refining Structure Based on User Insights

Feedback from testing informed revisions to the information architecture and overall flow. By restructuring screens and simplifying navigation, we ensured the final experience aligned more closely with user expectations and mental models.

Accessibility Considerations

Touch targets

Minimum 44×44 px for station selection and start actions.

Language & labels

Explicit, redundant status cues text and iconography.

Error recovery

Clear guidance and self-service paths when authentication fails.

UI Design Rationale

Visual hierarchy

Primary actions are dominant. Status and price are immediately visible.

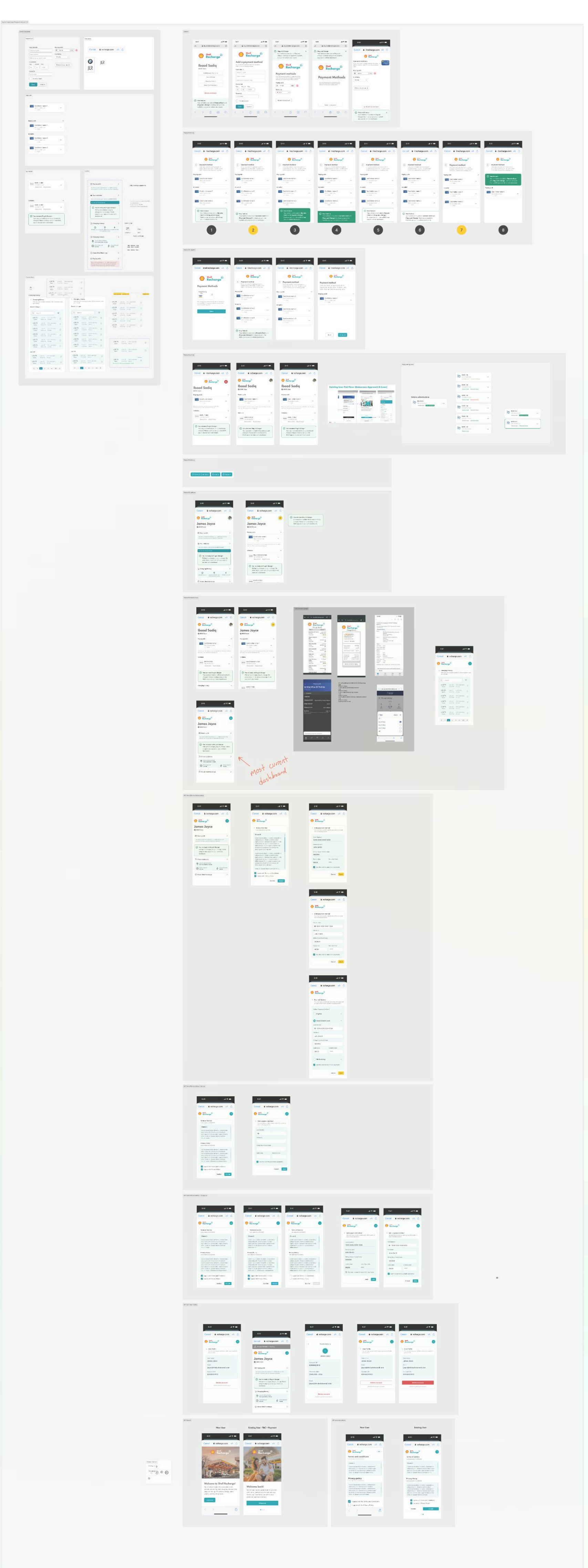
Consistency

Components are adhere to OEM + Shell design systems.

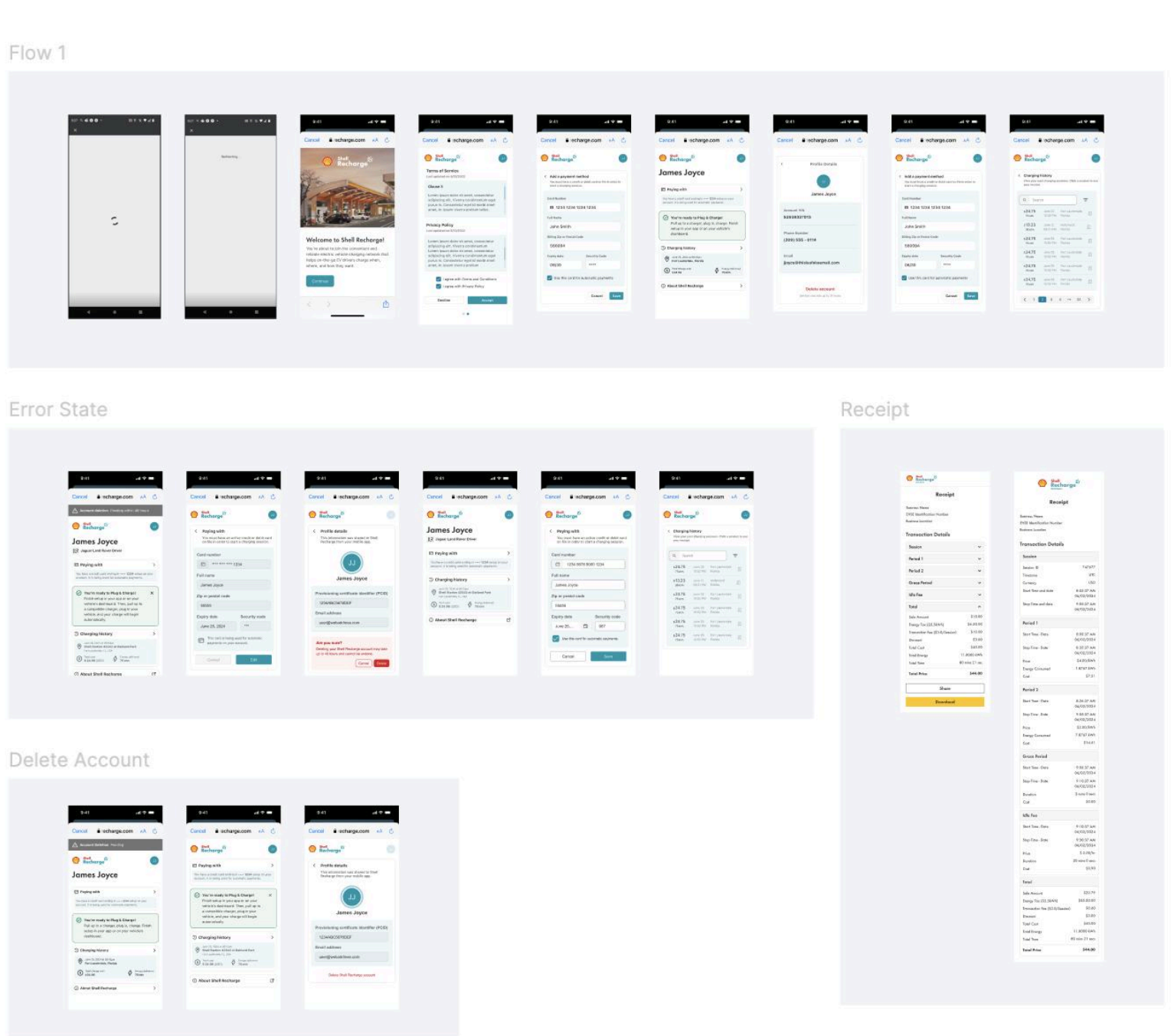
Micro-copy

Clear, non-technical language reduces uncertainty.

First Iteration Of UI Design Concepts



High-Fidelity UI Design & Brand Integration



Results

Aspect	Before	After
Initiation steps	7+ fragmented steps	3–4 unified steps (first-time)
App dependency	Multiple apps, wrong-app starts	OEM verified deep link + auto-start
Payment	Re-entry and unclear pricing	One-time setup + automatic payment
Confirmation	Delayed and ambiguous	Immediate, multi-channel confirmation
Brand feel	Inconsistent across systems	Premium alignment

Impact

Initiation Time

From 2–3 min to ≤ 30 sec for returning users

Session Certainty

Fewer retries and higher first-try success

OEM Program Enrollment

Driven by seamless setup and perceived trust.